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Self-monitoring with preschoolers

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Abstract

This research paper is a review of the literature on self-monitoring as an intervention for the preschool population. Self-monitoring is defined, and its elements are described. The theoretical background of self-monitoring is provided. The development of preschoolers is discussed in the context of self-monitoring, and behaviors that may be appropriately self-monitored by preschoolers are considered. Studies of self-monitoring with these children are reviewed. Issues needing further study are presented, and recommendations concerning the need for additional research are made.

Self-Monitoring with Preschoolers

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ABSTRACT

This research paper is a review of the literature on self-monitoring as an intervention for the preschool population. Self-monitoring is defined, and its elements are described. The theoretical background of self-monitoring is provided. The development of preschoolers is discussed in the context of self-monitoring, and behaviors that may be appropriately self-monitored by preschoolers are considered. Studies of self-monitoring with these children are reviewed. Issues needing further study are presented, and recommendations concerning the need for additional research are made.

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CHAPTER 1

Introduction

For many years, methods of classroom control and discipline using teacher-managed contingencies have been emphasized in the schools. Traditional behavior management or behavior modification strategies, involving external manipulation of antecedents and consequences, have been successful for a variety of problems in the school setting. Techniques such as token economies and differential reinforcement have increased positive behaviors; where as, time out, response cost, and overcorrection have decreased negative behaviors. These procedures are utilized daily by the teachers who are also responsible for monitoring student progress and generating feedback (Shapiro & Cole, 1994).

Although these traditional techniques demonstrated some success, they also possessed several limitations. When managing students using external controls, teachers take away opportunities children need in order to learn how to manage their own actions. Limiting students' involvement prevents them from developing skills needed to be more self-reliant (Cole & Bambara, 1992). Teachers also may not notice a number of their students' behaviors and thus are unable to provide consistent consequences. Less consistent consequences result in slower or nonexistent changes in behavior. Teachers who do administer consequences for appropriate behavior may become a cue for these behaviors. Therefore, appropriate behavior may only occur in the presence of the teacher and may not generalize to other settings (Shapiro & Cole, 1994). Another limitation is that teachers may hesitate to utilize particular strategies because they are time consuming and difficult to implement (Martens, Witt, Elliot, & Darveaux, 1985). Lastly, teacher-managed interventions have predominately been based on punishment strategies.

Research indicates that external punishment programs have some short-term effectiveness, but do not teach the skills needed for long-term behavior change (Shapiro & Cole, 1994).

Many teachers believe they are in control of students' learning because teachers direct the classroom activities, determine the instructional methods, and decide upon consequences for students' behaviors. This is not the case. Although they do not realize it, students are ultimately in control of their own learning. Students who do not realize this develop a dependency on the teacher, and their motivation is externally controlled (Ridley, McCombs, & Taylor,1994). Today, the focus of student management is shifting from external control to self-direction and self-motivation.

One of the fundamental goals of education is to encourage children to learn the skills of self-management (Shapiro & Cole, 1994). These skills enable students to complete a task without teacher aid, generalize skills to other settings, become more self-assured, and resolve conflict without adult facilitation. As children develop self-management skills, they become less dependent on external direction and develop the motivation to maintain their own behavior. The level of self-management skills by exhibited students varies according to age and ability; however, some form of independence skills can be expected of younger children. In the past decade, there has been an emphasis on early intervention and normalization. Interest in developing independence skills in at-risk preschoolers and persons with severe disabilities has increased greatly. Many regular education students could benefit from self-management development as well (Shapiro & Cole, 1994).

Purpose

The purpose of this paper is to review the literature regarding self-monitoring among preschool-age children. First, self-monitoring will be defined, and several elements of self-monitoring will be presented. The theoretical background of self-monitoring will

be provided, and the development of preschoolers will be addressed in relationship to self-monitoring. Behaviors appropriate for preschoolers to self-monitor will be discussed, and studies of self-monitoring with the preschool population will then be reviewed. Lastly, the issues surrounding self-monitoring and the preschool population will be summarized.

Statement of the Problem

Over the last two decades, self-management techniques have become recognized as effective means of classroom management. Self-management techniques use environmental influences that are less restrictive and more facilitating than traditional methods used to control behavior (De Haas-Warner, 1991). Because the preschool years are a critical time for children to acquire behaviors and skills that will be expected of them in kindergarten, self-management techniques have been used to teach preschoolers to manage their own behavior. A review of preschool literature regarding self-management reflects inconsistent findings (De Haas-Warner, 1992). Self-monitoring, a self-management strategy that has been successful with school-age children, is being considered for the preschool population.

Although self-monitoring has become more prevalent in the classroom, the majority of reports on the efficacy of this intervention have dealt with the school-age population. Limited research has been performed with preschoolers (Shriberg & Kwiatkowski, 1990). Based on the studies conducted to date, preschool children *are* able to self-monitor; however, there is little or no evidence of the ability to maintain and generalize target behaviors. Another concern is whether self-monitoring is developmentally appropriate for the preschool-age population. For example, according to Piaget's developmental theory, preschoolers are limited by egocentrism and other developmental characteristics that may hinder their ability to self-monitor. On the other

hand, Vygotsky's notion of self-talk suggests that preschoolers are capable of self-monitoring.

It is reasonable to question which behaviors are appropriate and/or necessary for preschool children to self-monitor. Researchers investigated preschoolers' ability to self-monitor on-task behavior and social interactions. According to Hutton (1985), it is important to self-monitor attentional or on-task behavior because preschoolers who have difficulty remaining on-task are at risk for further delays and problems. On the other hand, preschool programs that are characterized by child-centered approaches may not be concerned with on-task behavior because these programs emphasize respect for individuality and increased freedom (Morrison, 1997). Social interactions of preschool-age children are important to self-monitor; however, it is necessary to distinguish between interactions that are developmentally appropriate for preschoolers and those interactions that place children at-risk. Other behaviors that may be appropriately self-monitored by preschoolers are aggression, anger, and following directions.

Research Questions

The following questions are posed:

(1) Can preschool-age children self-monitor?

(2) Is self-monitoring a developmentally appropriate intervention for preschoolers?

(3) If preschoolers can self-monitor and self-monitoring is developmentally appropriate for this population, what behaviors are most appropriately self-monitored by preschoolers?

CHAPTER 2

Self-Monitoring

Definition of Self-Monitoring

The self-monitoring technique includes student observation of specific aspects of his/her own behavior and recording the presence or absence of the specific target behavior. Self-monitoring is a two-stage process. The student must first notice or be able to discriminate between aspects of his/her own behavior. He/she must then make an objective and accurate self-recording of the behavior (Armstrong & Frith, 1984; Lloyd, Landrum, & Hallahan, 1991; Mace & Kratochwill, 1988; Nelson, 1977; Shapiro & Cole, 1994). The student engages in self-monitoring for the purpose of counting, and ultimately improving, target behavior (Armstrong & Frith, 1984).

Elements of Self-Monitoring

The self-monitoring routine employs the components of observation and recording in various ways. This routine consists of four basic components that create variations in the implementation of self-monitoring: (1) presence of cueing, (2) observational (recording) procedures, (3) recording devices, and (4) training (Lloyd et al., 1991).

Cueing

Many applications of self-monitoring apply cueing; however, it is not used in all cases. Cueing simply indicates to the student that he/she should carry out the self-monitoring procedures. Cueing often consists of a tape recorder playing tones at frequent, irregular intervals. The tones can also occur less frequently and at regular intervals. The cue serves as a prompt for the student to evaluate and record his/her behavior (Lloyd et al., 1991). Another type of cueing involves marking certain problems on students' work. These marked problems serve as cues for the students to stop and assess the accuracy of their work (Rooney, Polloway, & Hallahan, 1985).

Observational Procedures

Students' self-monitoring patterns vary according to the observation system that they follow. The following methods are used by students to self-observe: narrations, frequency counts, duration methods, and time sampling (Lloyd et al., 1991; Mace & Kratochwill, 1988). Narrations are utilized in the initial stages of self-monitoring and involve the student recording the occurrence of the target behavior with a description of events preceding and following it (Mace & Kratochwill, 1988). Some students record their behaviors with a frequency count or event recording where they record every occurrence of the target behavior (Armstrong & Frith, 1984; Lloyd et al., 1991; Mace & Kratochwill, 1988). This can only be done with behaviors that occur less frequently and have an identifiable beginning and ending (Mace & Kratochwill, 1988). Duration measures are used to indicate the length of time of the target behavior. It is useful for behaviors when the goal is to alter the time engaged in a particular behavior, such as tantrums (Mace & Kratochwill, 1988). Time sampling is another method of observation. Rather than counting every occurrence of a target behavior, students periodically stop to assess and record their behavior at that time (Armstrong & Frith, 1984; Lloyd et al., 1991; Mace & Kratochwill, 1988). Cueing may be a part of this procedure (Lloyd et al., 1991).

Recording Devices

Self-monitoring is most effective when students overtly record their behaviors (Armstrong & Frith, 1988; Lloyd et al., 1991). Many techniques exist, and they generally fall under two categories. The first category is paper-and-pencil systems. Students make a tally mark for each time the target behavior occurs or record their behavior on a prepared record sheet that provides a structured and consistent format for recordings. The second category of recording methods is counting devices. Some examples of these devices include moving beads on a string, placing rings on a peg, or moving items from

one location to another. The moving of these 'things' represents the presence of the target behavior (Armstrong & Frith, 1984; Lloyd et al., 1991).

Training

Training students to properly use self-monitoring procedures is an important step in the process. Teachers or school psychologists can teach the self-monitoring technique to students in a single 15 to 20 minute session. Students can be taught the procedures individually or in groups. It is essential that trainers provide explicit explanations of the self-monitoring process and include the following elements in the training: (1) clear and simple definitions of the target behaviors, (2) modeling of the target behaviors, (3) a check for the students' understanding of the target behaviors, (4) a demonstration of the self-monitoring procedures, and (5) an observation of the students practicing the procedures (Lloyd et al., 1991; Mace & Kratochwill, 1988).

Implementing the Self-Monitoring Program

The presence or absence of cueing, the observation method and recording device used, and the training provided are important to the self-monitoring process. Three additional factors should be considered in the design and implementation of a self-monitoring program: (1) planning a system for evaluating the treatment, (2) planning for the withdrawal of the treatment, and (3) programming for maintenance and generalization (Lloyd et al., 1991).

Evaluating Treatment

Self-monitoring programs generate a great deal of data about the target behavior; however, these data cannot be used to evaluate the effectiveness of the procedure because students often do not provide an accurate assessment of their own behavior. Data gathered by the students tends to be an overestimation of the occurrence of the appropriate behavior. Fortunately, this bias in self-assessment is of little concern. Positive

changes in students' behavior are often the result of self-monitoring regardless of the students' recording accuracy. It is important, however, for those implementing the program to gather data that will allow an evaluation of intervention effects. School psychologists accumulate such data by collecting it themselves or training an independent observer to do so. The school psychologist or the independent observer engage in periodic observations when and where students are carrying out the self-monitoring procedures (Lloyd et al., 1991).

Withdrawing Treatment

The self-monitoring technique often involves the use of overt features such as a tape recorder to cue students to assess their behavior or a self-recording sheet to document the presence or absence of the target behavior (Lloyd et al., 1991). Cues and recording devices are important to use when teaching the self-monitoring routine (Heins, Lloyd, & Hallahan, 1986) but are not necessary after students have become skilled in self-monitoring (Hallahan, Lloyd, Kneedler, & Marshall, 1982; Lloyd, Bateman, Landrum, & Hallahan, 1989). Hallahan et al. (1982) and Lloyd et al. (1989) both systematically removed the cueing and recording components, and the students maintained improved levels of the target behaviors. School psychologists and teachers are responsible for deciding when a behavior change is stable enough to remove an element of the self-monitoring program (Lloyd et al., 1991).

Maintenance and Generalization

Studies have indicated that training and practice in the use of self-monitoring can create a change in the target behavior that can be maintained in the absence of the overt aspects of the program (Lloyd et al., 1991). In a study completed by Heins et al. (1986), follow up observations made two and one-half months after the termination of self-monitoring showed maintenance of positive effects. Because no information is

available regarding a length of time students need to engage in self-monitoring to achieve maintenance, school psychologists or teachers should independently monitor intervention data to determine desired levels and/or frequencies of target behavior. If treatment effects begin to decline, the practitioner can provide brief retraining sessions (Lloyd et al., 1991).

Two types of desirable generalization are possible with self-monitoring: (1) transfer to untreated but related behaviors, and (2) transfer to other settings (Lloyd et al., 1991). Hallahan, Lloyd, Kosiewicz, Kauffman, and Graves (1979) conducted a study in which self-monitoring treatment effects generalized from one behavior to another. A boy was taught to self-monitor his attending behavior; and, in the process, it improved his academic productivity. Warrenfeltz, Kelly, Salzberg, Beegle, Levy, Adams, and Crouse (1981) found that self-monitoring treatment effects transferred to another setting. Adolescents were taught social skills in a training setting and used self-monitoring to generalize those skills to a vocational classroom. Generalization of the effects of the self-monitoring treatment is as difficult to obtain as generalization of the effects of other school interventions (Lloyd et al., 1991).

Uses of Self-Monitoring

Self-monitoring has two major uses: (1) behavioral assessment and (2) self-regulated behavioral therapy (Armstrong & Frith, 1984; Mace & Kratochwill, 1988; Nelson, 1977). Behavioral assessment refers to the collection of data during two phases of therapeutic contact. The earlier phase of assessment involves determining the target behavior and its controlling variables. Individuals keep a behavioral diary in which they record problematic events and the circumstances that surround them. Consistent patterns found in this information can lead to the selection of target behaviors and possible intervention techniques (Nelson, 1977). The later phase of assessment is used during baseline and intervention to monitor frequency of the selected target behavior and evaluate

success or failure of the treatment (Armstrong & Frith, 1984; Mace & Kratochwill, 1988; Nelson, 1977).

The second major use of self-monitoring is self-regulated behavioral therapy. Self-monitoring is often therapeutic without additional reinforcement. The simple act of self-recording can cause positive changes in the frequency of target behavior. This therapeutic aspect of self-monitoring is referred to as reactivity (Armstrong & Frith, 1984; Mace & Kratochwill, 1988; Nelson, 1977).

Reactivity

An observed individual often reacts to being observed by changing his/her own behavior. This is called reactivity or reactivity to observation. When someone else is doing the observing, the target behavior may or may not be the behavior that reacts or changes in response to monitoring. However, when a target behavior is self-observed, it is the behavior most likely to be altered. When observation is completed by another, reactivity typically lasts four to five days. When self-observation occurs, reactivity effects are maintained much longer, up to 30 days (Armstrong & Frith, 1984; Mace & Kratochwill, 1988).

Self-monitoring may also result in behavioral change without the aid of additional intervention strategies. Numerous factors have been identified as potential influences on the occurrence of reactivity: (1) whether behaviors are desirable or undesirable, (2) individual's motivation to change, (3) type of instructions given to individuals, (4) nature of target behavior, (5) use of performance goals, reinforcement, and feedback (6) time of self-recording, (7) nature of the self-recording device, (8) number of behaviors monitored, (9) schedule of self-monitoring, (10) individual's awareness of accuracy, and (11) whether training for accuracy was provided (Mace & Kratochwill, 1988; Nelson, 1977; Shapiro, 1984).

Advantages or Benefits of Self-Monitoring

There are many advantages of self-monitoring for both students and teachers. First, it facilitates the learning of responsible behavior. As students progress through school, their responsibility increases while their support is reduced. Some adjust to this change, and others fail to make the transition. Self-monitoring could improve the eventual adjustment of many of these individuals (Armstrong & Frith, 1984).

Second, self-monitoring allows the observation of both obvious and 'hidden' behaviors. The majority of human behaviors are overt; they can be observed by others. Some behaviors, however, are difficult to observe. These behaviors are covert and are personal behaviors. Self-monitoring is preferred because it can be used to observe overt or covert behaviors (Armstrong & Frith, 1984; Nelson, 1977). Self-recorders may be able to provide more complete data than observers because they witness the entire population of target behavior compared to the sample that observers view (Mace & Kratochwill, 1988; Nelson, 1977). Students are the ones who have the greatest access to their covert behaviors, therefore, self-monitoring is the only form of observation available for such behaviors (Armstrong & Frith, 1984).

Third, self-monitoring is easily available, cost efficient, and convenient. The use of observers is impractical because they are less available, more expensive, and inconvenient to have in the classroom (Nelson, 1977). Self-monitoring also maximizes the use of teacher time. The demands on teacher time is great and is increasing every year. Teachers often times like to collect data on individual students but lack sufficient time. Self-monitoring saves valuable teacher time (Armstrong & Frith, 1984). On the other hand, Jeffrey (1998) conducted a study in which one of two teachers did not find self-monitoring to be a 'teacher-friendly' intervention. In this particular study, one fourth grade regular classroom teacher (Teacher 1) and one of her students and one special

education teacher (Teacher 2) and one student from the fourth grade regular classroom in which she team-taught utilized the self-monitoring intervention for the target behavior of work completion. Teacher 1 preferred the 'class-wide' strategies that she already had in place that did not require too much time. She stated that self-monitoring training required too much of her time. Teacher 1 indicated that the 'class-wide' interventions were more time efficient and easier to implement. Teacher 2, however, found self-monitoring moderately 'teacher-friendly.' She did not think training required too much of her time (Jeffrey, 1998).

Fourth, the use of self-monitoring places the emphasis on self-control and de-emphasizes externally managed controls (Mace & Kratochwill, 1988; Nelson, 1977). It also may improve self-awareness. Self-monitoring increases the students' recognition of their own behaviors which strengthens their roles in the behavior change process. The self-monitoring process allows students to understand the relationship between their behaviors and resulting consequences. It encourages students to understand the purpose of selected behaviors. Students who monitor their own behaviors often receive satisfaction from accepting personal responsibility. This may be one of the few times these students have demonstrated self-initiative, and it may increase their efforts to gain control over other aspects of their lives (Armstrong & Frith, 1984).

Other advantages of the self-monitoring technique include the generalization of behavior to other environments and the ease with which this technique may be introduced early in the educational process. Self-monitoring also is effective with low priority behaviors such as daydreaming or gum chewing. Because of more pressing behavior concerns, low priority behaviors are rarely addressed. Self-monitoring is, however, excellent for correcting these minor problems. Students who learn self-monitoring skills can be taught to avoid many problems by arranging their personal environment. The

process can also be enhanced by self-administered consequences in the form of reinforcers and punishers (Armstrong & Frith, 1984).

Theoretical Background

Self-monitoring is a behavioral intervention based on self-management principles. Self-monitoring is theoretically and research based. Accordingly, the purpose and principles of self-monitoring are articulated clearly. Self-monitoring is an intervention that was developed by cognitive behavioral theorists. Cognitive behavioral theory is an integration of both behaviorism and cognitive psychology. This integrated approach arose in response to theorists' discontent with purely behavioral standards.

American behaviorism began early in the twentieth century with the work of John B. Watson who believed in studying overt events or behaviors rather than the unobservable workings of the mind (Berk, 1998). Behavioral psychologists try to explain the causes of behavior by studying only observable and measurable behaviors . There is no reference to unobservable mental processes. Behaviorists emphasize behavior rather than thought and make the following assumptions: (1) all behavior is caused or determined , (2) the environment molds behavior, and (3) internal causes and mental states are useless in explaining behavior (Kalat, 1993).

Social learning theory is a behavioral approach that integrates cognition and behavior. Social learning theory, also referred to as modeling or vicarious learning, emerged between 1960 and 1970 and was influenced by psychologists who emphasized behavior, environment, *and cognition* as key factors in development. Many psychologists believe that behaviorists are basically right when they say development is learned and is strongly influenced by environmental experiences; however, many also believe that behaviorists went too far in declaring cognition as unimportant in understanding development (Santrock, 1995). Albert Bandura, one of the most prominent theorists of

the contemporary version of social learning theory, believed that individuals acquire new responses by observing and imitating the behavior of others (Kalat, 1993; Santrock, 1995).

Bandura's view emphasized reinforcement concepts including self- and vicarious reinforcement. Self-reinforcement occurs when an individual receives reinforcement from thinking about his/her own attitudes and behaviors in positive ways. Vicarious reinforcement involves a subject observing others, and then modifying his/her own behavior according to the behaviors and consequences viewed (Coleman, 1996). Bandura's theory of social learning stresses the importance of cognition or thinking and emphasizes how individuals think about themselves and others. The individual's own judgments and personal feelings of merit become important factors in the continuation of behaviors not reinforced by others or the environment (Coleman, 1996; Santrock, 1995). Social learning theorists believe that we can regulate and control our own behavior through our cognitions. Our thoughts about particular behaviors or situations lead us to control our behavior and resist environmental influence (Santrock, 1995).

Social learning theories that recognized the role of internal processes influenced the development of cognitive behavioral theory (Coleman, 1996). Research developments in psychology led to the incorporation of cognitive concepts influencing the cognitive behavioral movement (Hughes & Kemenoff, 1992). Behaviorism in its purest form would predict that identical circumstances would elicit identical responses; however, people often respond differently to the same stimuli. Cognitive behavioral theorists propose that cognitions or individual differences in thinking account for individual differences in responding (Coleman, 1996).

Cognitive behavioral theory emerged from the work of those who believe behaviorism only partially accounts for learning and behavior. Cognitive behavioral

theorists emphasize cognitions or thinking patterns as an important link between environmental stimuli and behavior. Interventions that derive from this theory involve changing distorted thinking patterns and negative self-talk into more productive modes and can be divided into two categories.

One intervention category, general cognitive techniques, includes Glasser's reality therapy and Ellis' rational-emotive therapy (RET). These techniques are based on the underlying premise that individuals can learn to redirect their behavior by changing their thoughts and attitudes. Reality therapy and RET directly address cognitive processes by attacking current illogical and irresponsible thinking. The past is irrelevant. The intent is to help individuals understand the present and future by reconstructing their thinking (Coleman, 1996).

Psychologists have bridged cognitive and behavioral strategies to develop cognitive behavioral techniques, the second category of cognitive behavioral interventions. Broadly defined, cognitive behavioral techniques refer to the effect self-talk or inner speech has on an individual's behavior. Reality therapy and RET seek to dispute general maladaptive thinking, whereas cognitive behavioral techniques apply strategies to specific tasks or problems. Cognitive behavioral techniques train students, through self-talk, to develop strategies or to problem-solve for themselves. Four common attributes of cognitive behavioral procedures are: (1) a self-imposed treatment, (2) verbalization, (3) a problem-solving strategy, and (4) modeling to teach the techniques (Coleman, 1996).

These techniques have demonstrated their utility in the improvement of both academic and behavioral problems. Self-management, the ability of an individual to regulate him/herself with minimum external guidance, is the goal of most cognitive behavioral techniques. The specific self-management techniques include self-instruction, self-reinforcement, self-evaluation, and self-monitoring, the focus of this paper.

Self-monitoring has been used to increase academic performance and on-task behaviors and decrease inappropriate behaviors (Coleman, 1996).

Preschool Population and Self-Monitoring

Self-monitoring methods have been used by both adults and children. Because of their developmental age, special considerations regarding self-monitoring procedures are often needed when it is carried out by young children. Younger children may have difficulty remembering how behaviors are defined. They may need additional prompts to remain attentive to the self-monitoring procedures (Shapiro, 1984). Kunzelman (1970) suggested that 'countoons' be utilized. These are simple stick figure drawings that demonstrate the specific behavior that is to be monitored. The children are directed to place a tally mark next to the picture that displays the behavior that occurs. This 'countoon' device may serve as a visual prompt for self-monitoring. It is unlikely that young children will be able to provide a narrative recording of their behavior. Thus the key in any self-monitoring procedure with these children is that the behaviors must be well-defined and clearly understood. The recording procedures must also remain uncomplicated (Shapiro, 1984).

Over the last two decades, self-monitoring has become more prevalent in the classroom intervention literature. In this time, almost all reports and research notes on the efficacy of self-monitoring have dealt with school-age children. There has been very limited research with the preschool-age population (Shriberg & Kwiatkowski, 1990). The question of whether self-monitoring is developmentally appropriate for preschoolers has been raised.

Cognitive Developmental Theory

According to Jean Piaget, children progress through four stages in their thinking, and each stage corresponds to broad changes in the structure or logic of that thinking.

These stages of development are: (1) sensorimotor, (2) preoperational, (3) concrete operational, and (4) formal operational (Smith, Cowie, & Blades, 1998; Wadsworth, 1984). Piaget's theory suggests that individuals possess an inborn capacity to coordinate existing cognitive structures and combine them into more complex systems. Individuals strive for a balance with the environment and reach this equilibrium through the joint process of assimilation and accommodation. Assimilation consists of taking in new experiences and fitting them into existing schemas. Accommodation involves adjusting existing schemas to fit with the nature of the environment. The complementary process of assimilation and accommodation is continual. An individual reaches equilibrium only to be put in disequilibrium by further learning (Smith, Cowie, & Blades, 1998).

According to Piaget's theory of cognitive development, preschool children are likely to be in the preoperational stage of thought. This stage generally occurs between the ages of two and seven and is characterized by the development of language and intuitive problem solving. The preoperational child becomes increasingly able to internally represent events, but his/her thinking is characterized by egocentrism (Smith et al., 1998; Wadsworth, 1984). Limitations of preoperational thought that may hinder preschoolers' ability to self-monitor include egocentrism, centration, and irreversibility (Berk, 1998; Santrock, 1995).

According to Piaget's cognitive developmental theory, the most significant deficiency of preoperational thinking is egocentrism. Individuals in this stage are centered on their own perspective and find it difficult to understand that others can view things differently. Thus young children tend to be relatively unaware of other perspectives; this pattern of thought allows them to believe that everyone else perceives, feels, and thinks the same as they do (Berk, 1998; Santrock, 1995; Smith et al., 1998). Piaget's theory suggested that the ability to make inferences about another's thoughts or feelings did not

appear until around age seven years (Smith et al., 1998). If preschoolers are unable to take the perspective of others, can they effectively self-monitor? Self-monitoring requires a child to recognize a behavior that an adult sees as a problem. If preschoolers do not take the perspective of others, they may not understand the target behavior in the same way that adults or teachers do. If they conceive target behaviors differently than adults or teachers, this could hinder their ability to self-monitor.

Centration is another limitation of preoperational thought. Children in this stage tend to focus on only one aspect of a situation, neglecting other important features. If this is so, preschoolers' thinking may center on one aspect of the self-monitoring procedure and reduce their understanding of the process. This idea goes along with another limitation, irreversibility. This notion indicates that preoperational children cannot mentally go through a series of steps and then reverse direction and return to the starting point. If children can perform the steps of self-monitoring, but not reverse the procedure mentally, their understanding of the process is limited. It is not known whether they need to understand the process as a whole rather than viewing it as separate steps that stand alone in order to benefit from self-monitoring.

Reinterpretations of Piaget

Over the past two decades, Piaget's cognitive notions of the preoperational child have been challenged. Researchers found that because Piaget's problems contained confusing or unfamiliar elements or too many pieces of information for young children to handle at one time, his data did not reflect preschoolers' true ability (Berk, 1998). Mossler, Marvin, and Greenberg (1976) and Ebeling and Gelman (1994) found that nonegocentric behavior appeared in preschoolers' everyday interactions. Newcombe and Huttenlocher (1992) determined that an awareness of others' points of view were evident by the age of four years. This research indicated that preschoolers may possess the ability

to take the perspective of others and may not be limited in this respect regarding self-monitoring.

Other research has been conducted in the area of preoperational children's cognitive deficiencies. Results showed that when tasks were simplified and made relevant to the children's everyday lives, they performed better than Piaget suggested (Berk, 1998). Au, Sidle, and Rollins (1993) and Rosen and Rozin (1993) concluded that preschoolers noticed transformations, were able to reverse their thinking, and understood causality in everyday contexts. This indicated that preschoolers may not be limited by centration and irreversibility when engaging in self-monitoring.

Sociocultural Developmental Theory

Vygotsky's theory of sociocultural development suggested that a complex and interdependent relationship between an individual and his/her social context enabled one to learn. It emphasized language and stressed that the learning process must be embedded in the context of the child's culture. Social interactions between a child and other members of the child's community determined what thinking and learning capacity he/she acquired. In contrast to the Piagetian perspective that emphasized intellectual growth as a manifestation of the child's unassisted activities, the Vygotskian view suggested that children solved practical tasks with the help of their own speech which was embedded in his/her social and cultural interactions (Smith et al., 1998).

A concept central to Vygotsky's theory is the 'zone of proximal development' (ZPD). The ZPD explains how children learn with the help of others and is the distance between actual level of development and potential level of development that a child can reach with the assistance of others. Because children learn from those who are more knowledgeable, it is not necessary to wait for a child to be 'ready.' Instruction should be at a level above the child's developmental level so it is a challenge, but not too far ahead

so he/she can still comprehend it. Therefore, instruction needs to be aimed at the receiver's ZPD (Berk, 1998; Smith et al., 1998). According to this, preschoolers should be able to self-monitor as long as we present the procedures within their social context and gear it to their ZPD.

The Vygotskian perspective also considers the notion of self-talk. Children develop as thinkers and learners through their speech which is formed through social interactions with significant others. These social interactions lead to children's self-talk. It is reasoned that children speak to themselves for self-direction and self-guidance (Berk, 1998). These monologues help children plan and organize their behavior. As children get older, their self-speech is internalized and becomes inner speech or private speech (Berk, 1998; Smith et al., 1998). According to Vygotsky's theory, private speech emerges by the end of the preschool years, around 7 years of age (Smith et al., 1998). Self-monitoring is an intervention that developed out of the belief that self-talk has an impact on an individual's behavior. If self-talk precedes private speech in the developmental sequence, and private speech emerges at the end of the preschool years, we can assume preschoolers can self-talk. If preschools are capable of self-talk, they should be able to self-monitor.

Information Processing

Based on Atkinson and Shiffrin's theory of information processing, the mind is divided into three basic parts: (1) sensory register, (2) short-term or working memory, and (3) long-term memory. Information first enters the sensory register where it is recognized and briefly retained. Interpretations of the information then move to the short-term or working memory. This is the conscious part of the mental system where material is actively worked on to retain information (Siegler, 1991; Smith et al., 1998). Limitations of the working memory include limited capacity and length of retention and lack of instantaneous retrieval (Siegler, 1991). Long-term memory is the permanent

knowledge base. Capacity is considered limitless and retention of information is maintained. Because long-term memory holds so much information, retrieval is sometimes difficult (Siegler, 1991; Smith et al., 1998). This mental system is similar throughout the lifespan; however, the amount retained and processed at one time increases with age (Smith et al., 1998). Two limitations on preschool children's thoughts are attention and memory, important domains involved in the way young children process information. Advances in these two domains increase during early childhood but are not well-developed (Santrock, 1995).

Attention

The infant's attention has important implications for cognitive development in the preschool years. The child's ability to pay attention changes significantly during the preschool years. Toddlers wander around, shifting their attention from one activity to another, spending little time focused on any one stimulus. Preschoolers often have difficulty focusing on details and are easily distracted. They potentially become disinterested in a stimulus quite easily and no longer attend to it (Berk, 1998; Santrock, 1995). Children ages 5 and 6 years in their first years of school also exhibit these behaviors (Santrock, 1995). If preschoolers are easily distracted and attend to an activity for only a limited time, they may not remain focused and able to attend to a self-monitoring program.

Memory

Memory is a central process in children's cognitive development. Preschoolers' recognition memory, the ability to identify a stimulus, is well-developed. Their recall memory is not as strong. They have difficulty generating a mental image of an absent stimulus (Berk, 1998; Santrock, 1995). This may indicate that preschoolers need some type of cueing at all times to be proficient in self-monitoring. If this is so, preschool

children cannot independently monitor their own behavior, one of the goals of self-monitoring. Because preschoolers cannot engage in adequate memory recall, they may need adult or teacher reminders to engage in the self-monitoring procedures when external cues are not available.

Appropriate Behaviors to Self-Monitor

To date, self-monitoring research with the preschool population has focused on on-task behavior and social interactions. Because of their developmental age, there are questions as to whether these are appropriate behaviors to be monitored by preschoolers. Are these behaviors the result of developmental characteristics that the children will eventually outgrow? If so, is it necessary to self-monitor? Are there other behaviors more appropriate for preschoolers to self-monitor?

On-Task Behavior

According to De Haas-Warner (1991, 1992), the preschool years are a critical time for children to acquire behaviors and skills that set the foundation for learning. A primary goal of preschool programs is to prepare children for kindergarten. Children who display poor attention skills or do not remain on-task may have greater difficulties adjusting to kindergarten prereadiness programs and, eventually, structured first grade programs (Dettre, 1983). Preschoolers who have difficulty engaging in developmental tasks or maintaining on-task behavior are at risk for further delays and problems. They may be referred to special education, be unprepared for kindergarten curriculum, or exhibit later behavior problems (Hutton, 1985). Bailey and Wolery (1984) state that waiting for engagement or on-task behaviors to develop is not an effective approach to preparing young children for independent work expectations. To increase on-task behavior, children should be provided with a structured intervention. It was indicated that the primary reason for attempting to increase on-task behavior with preschoolers is the expectation

that consistent on-task behavior would lead to increased work completion and more accurate and higher quality work performance (De Haas-Warner, 1992). Based on the above information, one may conclude that it is sensible and worthwhile for preschoolers to self-monitor their on-task behavior. There is, however, another side to this issue.

Developmental psychologists believe that individuals are born with an internal drive to be competent, and that children learn through their own intrinsic motivation. This notion of 'competence motivation' led to child-centered early childhood programs in which educators create environments with a wide variety of materials to enable children to learn at their own speeds and by challenging themselves (Wolfgang & Wolfgang, 1992). Child-centered programs emphasize respect for individuality and increased freedom. They possess an atmosphere of informality because formality is seen as antagonistic to genuine mental activity and emotional expression and growth. In the child-centered approach, natural development of the child is the key. Learning initiatives come primarily from the children, and the teacher's role is to facilitate and provide an environment in which children can follow their interests and learn from the activities resulting from those interests (Morrison, 1997).

Many developmentalists believe that young children learn best when they learn as individuals rather than in a total group situation. Although they will sit still and listen when the teacher addresses an entire class, this is not how young children develop cognitively, physically, socially, or emotionally. They need hands-on interactions with materials on their own (Beaty, 1992). Based on this point of view, should preschoolers be expected to stay on-task, or should they be free to engage in whatever strikes their interest at any given time?

Research

De Haas-Warner (1991) conducted a pilot study to determine if preschool-age children could learn to use self-monitoring to increase their on-task behavior during independent prereadiness tasks. The preschool classroom followed a structured curriculum and schedule throughout the day. Prereadiness skill development occurred every day for 15 minutes. It included visual-perceptual-motor tasks involving numbers and letters, coloring, and cutting and pasting. The tasks included classification concepts, number values, and typical preschool art projects.

The subjects for the study were two preschool students from the Easter Seal Society, integrated preschool program with a population of approximately 50% handicapped or at risk children. They were nominated for the study by their teacher because of the high frequency of teacher direction to complete their assigned task and the teacher's general concern for their underdeveloped on-task behavior. Of the two students, one was a 5-year-old female and one was a 4-year-old male. Baseline data were collected for 10 days, and the children demonstrated low on-task behavior without teacher or aid prompts or assistance.

The preschoolers received self-monitoring training that consisted of one 20-minute session conducted by the researcher. In the training session they were taught three behavioral self-management components: self-talk, self-appraisal, and self-recording. An audiotape emitted a low frequency sound every 30 seconds that cued the subjects to evaluate their own behavior and record it on a sheet taped to their desks. Students received verbal praise and hugs during the training for appropriate on-task behavior, and the self-monitoring technique was reviewed as needed during the first week. The length of time the students self-monitored was not given. The self-monitoring intervention was successful with both students. The 5-year-old female increased on-task behavior from 24

to 87%. The 4-year-old male increased from 14 to 67% on-task behavior. Fading of the auditory stimulus and self-recording sheets was not executed to determine the maintenance of the self-monitoring strategy. Generalization of the intervention was not measured because this study was conducted at the end of the year, and there were time constraints (De Haas-Warner, 1991).

It is encouraging that the subjects learned the self-monitoring strategy with ease and demonstrated use of it during independent work. The study is limited, however, because no attempts were made to determine if the children could independently monitor their own behavior without the aid of the tape recorder and recording sheet. The study could be improved by including an evaluation of the quality and quantity of the students' work before and during self-monitoring. Also, the students' self-recordings should have been compared to observers' recordings to determine the accuracy of the subjects' appraisals. Replications of the study would strengthen the findings.

De Haas-Warner (1992) conducted a second study that elaborated on the De Haas-Warner (1991) pilot study, focusing on maintenance of on-task behavior when the external controls of the program were faded. Four preschoolers from the Easter Seal Society, integrated preschool program were selected as subjects. The researcher spent five days observing the children, and then the researcher and teacher chose four children who consistently displayed difficulty with on-task behavior during prereadiness tasks despite the use of behavior management techniques. The first participant was a 5-year-old male who had a one year delay in his attentional skills, as measured by the Hawaii Early Learning Profile (HELP). He exhibited low rates of on-task behavior and poor work completion. The second subject was a 4-year-old female with a one and one half year attentional skills delay according to the HELP. She spent much of her time watching the work of others rather than engaging in her own tasks. The third subject was a 4-year-old

male who demonstrated difficulty with on-task behavior, following directions, and work completion. The fourth participant was a 6-year-old male who remained in preschool for an additional year due to his two year delay in attentional skills and inability to remain on-task to complete his work.

The self-monitoring intervention the four preschoolers engaged in included four phases. In phase 1, the baseline rate of on-task behavior was established, and the students were trained to self-monitor in one-on-one sessions by the researcher. The training session incorporated three behavioral self-management components: self-talk, self-appraisal, and self-recording. Phase 2 consisted of the implementation of the self-monitoring intervention. Phase 3 involved the fading of the student recording. The tone was still present, but the preschoolers did not record their behavior. Phase 4 was the fading of the tone. The preschoolers no longer heard a tone to cue them to evaluate their behavior, nor did they record their on-task behavior. The length of time spent in each phase was not provided. In each phase, the subjects engaged in 15-minute independent prereadiness tasks (De Hass-Warner, 1992).

Results of the study indicated that preschoolers could be taught to use self-monitoring as a strategy to increase on-task behavior during independent work and maintain the target behavior upon the removal of external prompts. Subject 1 had a baseline of 25.9% on-task behavior that increased to 87% during phase 2. For phase 3 and phase 4, he was on-task 92% and 94% of the time, respectively. Subject 2 went from 50% on-task in baseline to 92% on-task in phase 2. She maintained on-task behavior 95% of the time in phase 3 and 90% of the time during independent seat work in phase 4. Subject 3's on-task performance increased from 24% during baseline to 90% in phase 2. He was on-task 91% of the time in phase 3 and 94% of the time in phase 4. Subject 4 improved from 29% on-task at baseline to 93% on-task in phase 2. In phase 3 he

maintained on-task behavior at 89% and at 96% of the time in phase 4 (De Haas-Warner, 1992).

The accuracy of self-recording was calculated for three of the four subjects by comparing their self-recordings to observer recordings. Four students from a local high school were trained to be observers. Interobserver agreement was determined by using half of the observation sessions for each preschooler. Kappa coefficients for each observer pair ranged from .54 to 1.0. Four of the 6 pairs fell in the good to excellent range, and 2 of the 6 pairs fell in the fair to excellent range. Kappa coefficient ranges for the observers and Subject 1, Subject 2, and Subject 4 were .65 to1.0, .61 to .98, and .64 to 1.0, respectively. These suggest minimally acceptable to excellent reliability coefficients. Generalization of self-monitoring was not determined (De Haas-Warner, 1992). This study elaborated on the previous self-monitoring pilot study (De Hass-Warner, 1991) by determining maintenance through the fading of external prompts. It is limited in that it does not consider the generalization of self-monitoring to other tasks or settings.

Another study (Harding, Howard, & McLaughlin, 1993) was conducted to determine if self-monitoring was an effective intervention for disabled preschool children's on-task behavior. One preschool boy with multiple disabilities participated, and his on-task behavior was observed in three different settings: independent seat work, group work, and free-choice activities. Baseline data were gathered and self-monitoring was carried out in the three different settings. The tasks completed in each setting and information regarding any type of training in self-monitoring were not provided. The length of time spent in the three settings and carrying out the self-monitoring intervention was not discussed (Harding, Howard, & McLaughlin 1993).

The subject's baseline for on-task behavior during independent seat work was 68.1%; he improved his on-task behavior to 83% during the self-monitoring implementation. On-task behavior for group work was 83.9% before self-monitoring and increased to 86.9%. Baseline during free-choice activities for on-task behavior was 91.9%, and improved to 96% during self-monitoring. Maintenance and generalization of the effects of self-monitoring strategy were not determined (Harding et al., 1993).

One strength of this study is that it introduced self-monitoring across classroom settings. It did not, however, introduce the procedure across subjects. No attempts were made to determine if the child could independently monitor his own behavior. The generalization of treatment effects was not considered. Although the child made improvements in his on-task behavior, his off-task behavior was not low in al settings prior to self-monitoring. This may have affected the results of the intervention because there was limited room for improvement in the subject's on-task behavior. The accuracy of the student's self-recordings was unknown because they were not compared to observers' recordings.

Social Interactions

The social development of preschool-age children has received considerable attention over the last 25 years (Shearer et al., 1996; Strain et al., 1994). The majority of preschoolers follow a predictable and sequential path of development. Their social behaviors become more elaborate with increased age and experience (Strain et al., 1994). Children engage in four types of social interactions over the preschool years: (1) nonsocial activity (solitary play); (2) parallel play (playing near other children and using the same materials, but not interacting with them); (3) associative play (engaging in separate activities, but interacting through exchanging of toys and commenting on one another's behavior); and (4) cooperative play (interacting with one another to reach a

common goal such as playing 'house,' make-believe, or building a sand castle). All of these interactions are present during the preschool years, but nonsocial activity decreases with age (Berk, 1998).

Many people show concern for a preschooler who spends large amounts of time playing alone. Most nonsocial activity of preschool-age children is positive and constructive (Berk, 1998). Only certain types of nonsocial activity are cause for concern during the preschool years. Children who engage in aimless wandering, hovering around peers, and functional play involving immature, repetitive motor action should be singled out for intervention (Coplan, Rubin, Fox, Calkins, & Stewart, 1994). Preschoolers with disabilities, such as the subjects with autism in two of the studies reviewed, follow a significantly different course of social development than their nondisabled peers. These children's acquisition of age-appropriate play and interaction abilities also required intervention efforts (Odom, McConnell, & McEvoy, 1992). Social interactions of preschoolers appear to be appropriate for self-monitoring; however, one must be able to recognize social interactions that require intervention and those that are developmentally normal.

Research

Strain, Kohler, Storey, and Danko (1994) examined the effects of a self-monitoring intervention on the social interaction of preschoolers with autism. Three preschool boys with autism, 5-year-old Aubrey; 4-year-old Barrett; and 3-year-old Sidney, were the subjects. Ten of their nondisabled peers ranging in age from 3 to 5 years, Aubrey's 3-year-old brother, and Barrett's 8-year-old sister also participated in the study. All preschoolers, disabled and nondisabled, were provided social skills training by their teachers and mothers that focused on: (1) being the play organizer or suggesting what to play, (2) sharing with others by offering or answering their requests, and (3) assisting

others by offering or answering their requests. The preschoolers were taught to self-monitor their social interactions at school and home. The teachers' training at school consisted of eight to ten 10-minute sessions, and the mothers' training at home included four 10-minute sessions.

Self-monitoring occurred in school and at home and consisted of the child placing a foam disk in a cylinder immediately after he engaged in a positive interaction with a peer or sibling. After a designated number of disks were placed in the cylinder, the targeted preschooler and the nondisabled peer or sibling would consume an edible reward. This reward system was systematically faded throughout the self-monitoring process. The boys with autism also were given adult prompts by teachers and mothers to encourage social interactions. The teacher prompts were systematically faded over time, but the mothers were allowed to provide unlimited direction throughout the process (Strain et al., 1994).

Results indicated that self-monitoring was an effective intervention for the social interactions of preschoolers with autism. The three males began the study with either no or minimal interaction with peers. Aubrey completed the study with 39% positive interaction at school, Barrett with 40% positive interaction at school, and Sidney with 36% positive interaction at school. Aubrey increased his social interactions in the home setting from 2 to 40%. Barrett's home social interactions improved from 10 to 35% during self-monitoring. Sidney was not assessed in the home setting because he did not have any siblings. Maintenance of the social interactions without the self-monitoring procedure was not determined, nor was the generalization of the treatment effects to other behaviors or settings (Strain et al., 1994).

Although the edible rewards and teacher prompts were faded throughout the study, maintenance was not determined because fading of the recording device (foam disks) and parent prompts did not occur. The self-monitoring procedure was carried out

by the subjects in both the school and home settings, but generalization was not determined. The accuracy of the preschoolers' self-recordings were unknown because they were not compared to observer recordings.

Another study (Shearer, Kohler, Buchan, & McCullough, 1996) examined the effects of self-monitoring on the activity engagement and social interaction of preschoolers with autism. Three 5-year-old males with autism and nine nondisabled peers ranging in age from 3 to 5 years participated in the study. All children were enrolled in a half-day integrated preschool program. Four to six sessions of baseline data were collected. All preschoolers participated in six 10 to 15 minute social skills training sessions implemented by the researchers. In these sessions they learned to exchange play organizers and share offers in sociodramatic and manipulative activities. Three strategies of initiating interactions, responding to another's overtures, and being persistent in social bids were taught. All the children also engaged in 15 minutes of self-monitoring training. The preschoolers used a string of 12 beads to record their social interactions. When an appropriate interaction occurred a bead was moved by the student (Shearer et al., 1996).

The preschoolers engaged in alternating intervention conditions that consisted of adult and child monitoring procedures. The adult monitoring involved prompts to engage in social interactions. The adult also moved beads to record the positive interactions (social initiation of one child followed by a positive response from another) of each child with autism and provided them with a small reward if they accomplished 6 to 11 exchanges with their peers during an 8-minute session. If 12 or more beads were moved, the children selected an additional reward. The child monitoring included the children receiving only three prompts from adults to exchange overtures and moving their own beads for completed social interactions during an 8-minute session. The adult again provided rewards for reaching predetermined numbers of interactions. The length of the

alternating procedure ranged in time from four sessions in a particular intervention phase with one child to eight sessions in a different intervention phase with another. Lastly, the boys self-monitored. They were not provided any prompts from the adult and recorded their own behavior by moving the beads. Children received a small reward if they correctly moved 6 or more beads during an 8-minute session. They received an additional reward for 12 or more beads. It was not indicated how long the children self-monitored (Shearer et al., 1996).

The three males with autism were able to self-monitor and engaged in self-recording 50 to 60% of the time. Although the self-recordings only occurred half or slightly over half of the time, they were 99% accurate. According to the results, the three alternating interventions for the boys with autism were equally effective. Although the three boys exhibited high levels of active engagement with their peers during baseline, there was an increase in the preschoolers' social interactions during the intervention phases. Even though the children's independent interactions were maintained throughout the three different interventions, there were differences in the type of interactions. The children's interactions were more meaningful in the earlier sessions when they were prompted by an adult. Their peer interactions became increasingly brief in the later sessions when adult prompts were faded. For example, children engaged in higher quality interactions, such as playing together, in earlier sessions than in later sessions where they made simple toy exchanges. These results indicated that self-monitoring had an impact on the social interactions of the targeted preschoolers, but there were questions as to whether it maintained the positive behavior. Generalization of the behavior was not evaluated (Shearer et al., 1996).

Although this study demonstrated that preschoolers can self-monitor, it did not determine the long-term maintenance of the target behaviors. The generalizability of the target behaviors to other situations or settings also was not assessed.

Aggression

All children express aggression from time to time. Two forms of aggression emerge by the early preschool years. The most common form of aggression is instrumental aggression when children are not deliberately hostile. Children carrying out this type of aggression want an object or privilege, and push, shout, or attack the person in the way when trying to get it. Hostile aggression, the second form, is meant to hurt. This occurs when a preschooler hits, insults, or tattles on a peer to cause injury (Berk, 1998). Instrumental aggression declines with age as preschoolers learn to compromise. Although it is rare in comparison to friendly interactions, hostile aggression increases between 4 and 7 years (Shantz, 1987).

Children's aggressive behavior has been linked to peer rejection. In the preschool years, aggressive children tend to be disliked and unpopular (Smith et al., 1998). Although an occasional aggressive exchange between preschoolers is normal and expected, some young children display abnormally high rates of aggression (Berk, 1998). These are the students most likely to be rated negatively by their peers and would benefit from an intervention. Therefore, aggression may be an appropriate behavior to be self-monitored by preschoolers as long as it occurs at a high rate. No studies have investigated this.

When assessing a preschooler's behaviors, one must take into consideration the child's developmental age and characteristics. One needs to determine the developmental appropriateness of a child's behavior before he/she decides to intervene with self-monitoring. The behaviors of on-task, social interactions, and aggression were

addressed. Other behaviors that may be appropriately self-monitored by preschoolers but have no research are following directions and anger.

Issues Needing Further Study

Based on research to date, it can be concluded that preschool-age children are capable of self-monitoring. Not only can preschoolers self-monitor, but preschoolers with disabilities can self-monitor as well. It appears that self-monitoring is an effective intervention for increasing on-task behavior and social interactions of preschool-age children. Although self-monitoring procedures were demonstrated, there are questions as to whether it helps maintain and generalize target behaviors and how accurately preschoolers self-record target behaviors.

Two of the five cited studies addressed the issue of maintenance, but only one provided strong evidence of maintenance (De Haas-Warner, 1992). Neither of the two studies demonstrated long-term effects of self-monitoring. Although one study utilized the self-monitoring intervention in both the school and home settings (Strain et al., 1994) and another implemented the procedure across classroom settings (Harding et al., 1993), none of the studies considered generalization of the treatment effects to unrelated behaviors or settings. In summary, maintenance and generalization effects of self-monitoring have not been supported in the literature. These effects are an important part of successful self-monitoring.

Two of the five studies analyzed preschoolers' accuracy in self-recording. One study (De Haas Warner, 1992) concluded that the children were minimally average to excellent in their accuracy. The other study (Shearer et al., 1996) indicated that although the accuracy was high (beading moving was 99% accurate when it occurred), self-recording only occurred 50 to 60% of the time. A consistency level of 50 to 70% is adequate to ensure short-term effectiveness of children's self-monitoring (Shearer et al.,

1996). Although it has been suggested that change resulting from self-monitoring does not necessarily depend on accurate or reliable self-recording, it may be important regarding the preschool population. Accuracy of self-recordings may reflect students' understanding of the target behaviors and/or self-monitoring procedures.

Conclusion

Summary

Self-monitoring is a technique that has become more prevalent in the last two decades. It is a procedure that involves student observation of specific aspects of his/her own behavior and recording the presence or absence of the target behavior. The basis of self-monitoring is to develop internal control so students are internally motivated to maintain their own behavior. Self-monitoring has been used by elementary students to increase on-task behavior, work completion, and social interactions, as well as improve study skills and performance in specific academic areas. It has also decreased inappropriate verbalizations and aggression of elementary students.

To date, the majority of research on the efficacy of self-monitoring has focused on school-age children. Little research has been done with the preschool population. There is the concern that self-monitoring is not developmentally appropriate for preschoolers. According to Piaget's theory of cognitive development, preschoolers are most likely in the preoperational stage of thought characterized by egocentrism, centration, and irreversibility. These developmental characteristics may hinder children's ability to self-monitor. On the other hand, recent findings have challenged Piaget's notions and indicated that students in the preoperational stage may not be limited by these characteristics. Vygotsky's theory of sociocultural development argues that individuals problem-solve through self-talk, a important part of the self-monitoring process. According to this theory, self-talk emerges in the preschool years suggesting that children

of this age can self-monitor. Information processing theory discusses deficits in preschoolers' attention and memory that may affect their ability to self-monitor.

Five studies of self-monitoring with preschoolers were reviewed. It can be concluded that preschoolers can do the self-monitoring procedures, but there is little evidence of the maintenance of behaviors. There is no evidence to suggest that treatment effects are generalized to other untreated behaviors or settings. Maintenance of target behaviors and generalization of treatment effects are important for successful self-monitoring.

Self-monitoring research with the preschool population has focused on on-task behavior and social interactions. Questions are raised as to whether these behaviors are appropriate for preschoolers to self-monitor because of their developmental age and characteristics. According to De Haas-Warner (1991, 1992), it is important for preschoolers to self-monitor their on-task behavior to help prepare them for the tasks of kindergarten. Developmental psychologists, on the other hand, would argue that preschoolers should be able to freely engage in their environment and learn from acting on their own interests. Social interactions of preschoolers receive much attention. Adults often show concern for those who spend a lot of time playing alone. What many adults do not know is that solitary play is developmentally normal. One only needs to intervene with those who are socially impaired due to a disability or those who display dysfunctional interactions. Aggression is a behavior that may appropriately be self-monitored by preschoolers. As with social interactions, preschoolers possess different levels of aggression, and some aggressive behaviors are developmentally normal. One must know the difference between developmental aggression and aggression that should raise concern. Two other behaviors that may be appropriately self-monitored by the preschool population are following directions and anger.

Implications for Practice

At this time, self-monitoring with the preschool population must align with developmentally appropriate practices. Research regarding maintenance and generalization of self-monitoring does not exist to suggest that it is a successful intervention with these children. Much more research needs to be conducted.

Directions for Future Research

Because research is so limited in the area of self-monitoring with the preschool population, future work needs to focus on the following questions: (1) Can preschoolers effectively self-monitor? (2) Is self-monitoring a developmentally appropriate intervention for preschoolers? (3) What is the maintenance of target behaviors? (4) Is there generalization of self-monitoring treatment effects? (5) If preschoolers can self-monitor, what behaviors should they self-monitor? (6) What is the present frequency of the use of self-monitoring? (7) Are parents and preschool teachers receptive to self-monitoring as an intervention? (8) If parents and teachers are knowledgeable of the self-monitoring intervention, can they implement it? (9) What are parent and teacher reactions to implementing self-monitoring? (10) Is the intervention teacher friendly? (11) Is self-monitoring effective as a conjoint (home and school) intervention?

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